SELF-RETAINING CLOSET BOLT

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This invention is concerned with bolts utilized in the attachment of vitreous toilet bowls to the conventional plumbing coupling utilized in homes, apartments and the like. In particular the invention is concerned with a novel bolt structure hereinafter referred to as a closet bolt which will facilitate the mounting and installation of toilet bowls and which will reduce the expense heretofore accepted as a necessary evil in the plumbing trade.

By way of explanation of the invention, it should be noted that a vitreous or ceramic toilet bowl is conventionally attached to the sewer and plumbing lines by means of a flanged coupling which is inserted through a suitable hole provided in the flooring and is connected to the conventional sewage piping. The flange of the coupling is of such a diametric dimension as to extend beyond the inner periphery of the hole provided in the floor. The flange is also provided with a series of two or more arcuate slots having one enlarged end adapted to receive the head of a bolt. The bolt or bolts, as the case may be, are provided with a head of a generally oval configuration so that they may be slipped head down into the slots and will project up through the flange. The ceramic toilet bowl is provided with bolt-receiving holes in its base so that the threaded portion of the closet bolts inserted in the slots will project upwardly through the base of the toilet bowl. Suitable washers and cap screws are then engaged with a bolt and tightened in a conventional manner after which the unused portion of the bolt is broken off and the nut and that portion of the bolt above the toilet base are covered with a ceramic, decorative cover.

Despite the most conscientious efforts of construction personnel, more often than not the hole in the flooring is eccentric with respect to the flanged coupling or the hole may be enlarged so that the slots provided in the coupling flange are disposed within the boundary of the hole in the flooring. Thus, when the closet bolts are inserted within the slots in the flange of the coupling member these bolts may drop down into the building structure beneath the floor and consequently are lost. Also, when it is noted that a plumber installing a toilet bowl must pick the toilet bowl up and position it over the flanged coupling with a substantial part of his vision obscured by the size of the toilet bowl, it will be appreciated that considerable difficulty is experienced in properly positioning the holes in the base of the toilet bowl on the upwardly extending closet bolts. Again, due to the eccentricity that may exist between the position of the flanged coupling and the hole in the floor as the toilet bowl is lowered and jockeyed into position the closet bolts may be moved so as to again fall through the hole in the floor into the interior building structure.

Loss of closet bolts is an expensive proposition for a plumber. This is due to the fact that these bolts and the associated nuts and washers are sold in the trade as sets and are not ordinarily purchased as individual units. Further, each time a bolt is knocked out of position or lost through the hole in the floor the plumber must replace same before he can continue with the complete installation of the toilet bowl. This involves a considerable loss in time and effort. The expense of bolt loss and the loss in time has been productive of various makeshift means of retaining the closet bolts in their upended position such as by the use of sealing materials, putty, matchbook covers, wood slivers, and the like inserted beneath the flange and in contact with the bolt head but in every case these makeshift efforts are not successful because the weight of the toilet bowl being lowered onto the bolts is sufficient to push the bolts through the slots in the flanged coupling and also, considerable loss of time evolves from attempts to hold the closet bolts in place and properly positioned to receive the bowl.

The present invention, then, is directed to a novel closet bolt structure which when used in combination with a conventional flanged coupling eliminates the previously-mentioned difficulties experienced by a plumber both in respect of installation time and in loss of bolts.

It is therefore an object of the invention to produce a novel self retaining closet bolt.

It is another object of the invention to produce a self-retaining closet bolt which may be sold in accordance with the attached claims and which will prevent substantial loss both of time and money.

A still further object of the invention is to produce a novel closet bolt which may be manufactured and marketed economically and which will eliminate virtually all of the difficulties experienced with conventional closet bolts.

An additional object of the invention is to produce a closet bolt which may be used universally in installing toilet bowls.

These and other objects of the invention are accomplished by providing a closet bolt having a generally oval head, a threaded fastening portion extending from the head and generally eccentric with respect thereto and a diametrically reduced, circumferentially smooth shank portion disposed between the head and the fastening portion of said bolt and concentric with respect thereto, said shank portion being surrounded by a floating washer member enabling movement of the washer longitudinally of the shank portion whereby said washer may be disposed above the flange of a toilet bowl coupling member, where required, to retain the bolt head down disposed within the slot provided in the flange member.

Having described in broad language the purpose and structure of the present invention, same will be discussed and disclosed in detail in conjunction with the drawings appended hereto and wherein

**FIG. 1** is a top plan view of a bolt comprising the present invention.

**FIG. 2** is both a sectional view of the bolt structure shown in **FIG. 1** and taken along the line 2—2 thereof and showing the assembly components as conventionally sold in the plumbing trade,

**FIG. 3** is an elevational sectional view showing the manner in which the invention is used and finally,

**FIG. 4** is a top plan view taken along the line 4—4 of **FIG. 3**.

As shown in **FIG. 1**, the bolt comprises a head 2 of generally oval configuration. The purpose of the oval configuration of the head will become apparent as the discussion proceeds. Extending from the head on one side thereof is a typical threaded fastening portion 4 which receives a cap nut 6 and a washer 8, as illustrated in **FIG. 2**. The threaded portion of the bolt is connected to the oval head by means of a reduced shank 12. The shank is provided with a circumferentially smooth outer surface and is of a diameter slightly less than that of the threaded portion 4.

Surrounding the shank portion 12 is a washer member 14 shown as being annular in configuration, but which may be of any suitable shape, said washer having a substantial aperture 16 which is somewhat larger in diameter than the shank portion 12 but is substantially smaller than the threaded portion 4 of the bolt. The washer 14 thus is captured by the annular land 18 which connects the
larger diameter threaded portion 4 to the reduced shank portion 12 and the oval head 2. However, due to the relative diameters of the central aperture 16 and the shank portion 12 the washer may move or float longitudinally along the shank between the two extreme positions, one in engagement with the land 18 and the other in engagement with the head of the bolt 3. Particularly washer 14 is of a metal having high strength characteristics whereby the washer is formed relatively thin as compared, for example, with the head 2. The purpose of this will subsequently become apparent.

Turning now to FIG. 3 the use of the bolt will become apparent. As shown in FIG. 3 the conventional sewer pipe 6 is disposed beneath the floor 22 as is conventional in building practice. Disposed within the end of the pipe 6 for the purpose of connecting a toilet bowl thereto is a flanged coupling member 30 having a cylindrical skirt portion 32 which extends downwardly into the interior of the sewer pipe 6 and which may be fastened or secured with respect thereto by any conventional plumbing practice. The upper edge of skirt portion 32 is provided with an annular flange 34 extending radially outwardly therefrom, said flange as seen clearly in FIG. 3, having an L-shaped cross section terminating in a downwardly extending annular lip 36. The lip 36 is adapted to rest against the top surface of floor 22 and provides for a slight space 38 underneath the flange 34, also as clearly shown in FIG. 3. The coupling member 30 is conventional and is generally formed of a rough cast iron so that the thickness between the upper surface and the interior of flange 34 between the skirt portion 32 and the lip 36 may vary considerably. Also, as is conventional the flange 34 is provided with at least two and more often four, two being illustrated in FIG. 4, arcuate slots 42 having enlarged end portions 44 which will permit insertion of the oval head 2 beneath the flange with the shank portion and threaded portion 4 and 12, respectively, of the closet bolt extending up through the slots 42.

With the bolts positioned in the slots 42 it will be seen that the head 2 engages the underside of the flange and that the threaded portion 4 projects upwardly and can receive a toilet bowl 50 shown in dotted outline. The toilet bowl 50 is conventionally equipped with apertures 52 at a predetermined position in the base 54 so that the closet bolts must of necessity be so positioned in the slots as to pass upwardly through the apertures 52.

The usual procedure for installing the bowl 50 is thus to position the slots 42 and thereafter to lower the bowl 50 onto the bolts from the top after which the nuts 6 and washers 8 are applied to the threaded portion 4 of the bolts. It will be obvious that due to the size and weight of the bowl 50 the person installing the bowl must lift same with both hands while the bowl is being lowered considerable force is brought to bear on the closet bolts tending to push the bolts out of the slots 42, and unless the floor 22 extends beneath the head 2 of the respective bolts will be dislodged downwardly.

As has been stated previously, more often than not, the hole in the floor 22, same being identified by numeral 46, is either larger than the skirt portion 32 or coupling 30, or because of the usual construction tolerances the hole 46 may be eccentric with respect to the sewage pipe 6 with the result that the coupling member is not disposed concentrically with respect to the hole. Such a condition is illustrated both in FIGS. 3 and 4, it being noted that the hole 46 is so located with respect to the flange 34 of coupling member 30 that at least one of the bolts is not supported by floor 22 and thus can be pushed downwardly through the hole 46 or will drop of its volition through the hole 46 unless restrained in some manner. However, as shown in FIG. 3 the floating washer 14 may be moved upwardly along the shank portion 12 of the closet bolt and after the closet bolt head 2 is inserted into the slot 42 the washer 14 will restrain the closet bolt from dropping out of the slot 42 and through the hole 46 in the floor 22. Preferably a reinforcing member and because it can move longitudinally along the shank portion 12 it will readily accommodate between itself and the bolt head 2 for any variations in thickness of the flange 34 due to the rough cast iron characteristics of the coupling 30. At the same time, since the bolt is restrained in its position within the slot it cannot be displaced downwardly and lost even when the bowl 50 is lowered toward its proper position even though the apertures 52 in the base 54 thereof may not immediately align with the position of the respective closet bolts. It is a simple matter for the person installing same to allow the bowl to rest on the bolts and to thereafter slide the bolts in the slots 42 until proper registry of the bolts with the apertures 52 is attained, at which time the bowl will automatically position itself with respect to the coupling member 30.

In order to make the closet bolt universal, that is applicable to any situation, the washer 14 as has been stated, is relatively thin, being fabricated of a metallic steel or other metal having high resistance to bending. Thus, as shown in FIG. 3 while the washer 14 will prevent displacement of the bolt downwardly from slot 42 even with the full weight of the vitreous toilet bowl resting thereon, at the same time the washer will not interfere with the use of the closet bolt if the floor area 22 extends beneath the head as shown in the left-hand side of FIG. 3. In this latter instance the washer can simply be dropped down against the head 2 and inserted beneath the flange 34 and the customary threaded portion 4 and 12, respectively, of the closet bolt extending up through the slots 42.

Turning briefly to FIG. 2, it will be noted that the threaded portion of the bolt is provided with a series of notches 20 spaced at increments along its length. The function of these notches is to facilitate breakoff of that portion of the bolt which may protrude above the floor 22 when the nut is drawn tightly against the base 54 of the toilet bowl 50. It is necessary that the usual closet bolt be somewhat longer than will be necessary in order that it may accommodate toilet bowls having bases of different depths. Thus as the nuts are drawn down the projection of the unused portion of the bolt above the nut would be decidedly unsightly if not cut off or removed. It is the usual practice then to saw the unused portion of the bolt above the nut 6 in order to remove same and to facilitate capping of the nut 6 with the usual decorative ceramic or vitreous nut cover customarily used in the trade.

It will be noted that the head 2 of the bolt is oblong in configuration. The purpose of this is two-fold. First it permits of insertion of the head between the downwardly depending flange 34 and the depending skirt 32 of the coupling 30 and, secondly, when a torque is applied to the bolt, as when the nut is drawn down thereon, the bolt will twist with the longer dimension of the head turning so as to engage either the edge or the skirt 32 or the interior of the depending member 30 so that the nut may be readily drawn down and tightened thereon.

Similarly, the washer 14 is shown as being generally doughnut or annular shaped and it will be appreciated that other shapes may be used though for convenience an annular washer appears to represent the most economical approach to the problem.
Having thus described the invention in detail, it will be readily apparent that various modifications will occur to those skilled in the art, which modifications fall within the spirit and scope of the invention as defined by the following claim wherein what is claimed is:

In the combination with a coupling for connecting a toilet bowl to a sewage system comprising a central tubular conduit having a radial flange with a downturned peripheral edge concentric with said conduit and a pair of arcuate slots having enlarged end openings formed in the radial flange and a toilet bowl mounted above said flange and provided with at least one bolt hole adapted to register with said slots; a self-retaining bolt connecting said bowl to said coupling and passing through said slot in said flange and said bolt hole in said bowl, said bolt being inserted upwardly through said slot and said hole and including a generally oval head having a narrow axis dimension capable of fitting between said conduit and said downturned end of said flange and a longer axis dimension greater than the aforesaid spacing between said conduit and said flange, said bolt further including a threaded portion connected to said oval head by a shank having a diameter smaller than the diameter of the threaded portion and joined thereto in the area of a circumferential shoulder; said shoulder being spaced a substantial axial distance from said head; a thin metal washer having high resistance to bending mounted on said shank portion, said washer being provided with a central aperture having a diameter only slightly larger than the diameter of the shank portion, and smaller than the diameter of the threaded portion of said bolt so that it is loosely confined between said shoulder and said bolt head whereby when said bolt is inserted through said coupling flange, head down, said washer may be disposed above the top surface of said flange and bridge said slot to retain the bolt therein and whereby when said bowl is passed over the threaded portion of said bolt, turning motion applied to said bolt will engage said head with either the surface of the conduit or the inside of the downturned edge of said coupling flange to permit the attachment and tightening of a retaining nut on the threaded portion of said bolt.

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